WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

a collector layer comprising a first kind of semiconductor material;

a base layer including a first base portion and a second base portion, said first base portion coming in contact with the first collector layer and comprising the first kind of semiconductor material, said second base portion coming in contact with the first base portion and comprising a second kind of semiconductor material; and

an emitter layer coming in contact with the base layer and comprising the first kind of semiconductor material, said emitter layer forming a heterojunction with the base layer.

2. A semiconductor device according to claim 1, wherein the semiconductor device comprises a bipolar transistor provided with the base layer, the emitter layer and the collector layer, and a MIS transistor formed on the same chip as the bipolar transistor.

3. A semiconductor device according to claim 1, wherein an energy gap of the first kind of semiconductor material is larger than that of the second kind of semiconductor material.

4. A semiconductor device according to claim 1, wherein a breakdown field of the first kind of semiconductor material is larger than that of the second kind of semiconductor material.

5. A semiconductor device according to claim 1, wherein the first kind of semiconductor material is silicon, and the second kind of semiconductor material

is silicon germanium.

6. A semiconductor device according to claim 1, wherein a film thickness of the first base portion is set such that, when a bipolar transistor having the base layer, the emitter layer and the collector layer is in a non-saturated operation state, a depletion layer extending from a junction between the collector layer and the base layer does not reach the second base layer.

7. A method for manufacturing a semiconductor device, comprising:

forming a first layer on a semiconductor substrate, said first layer comprising a first kind of semiconductor material which includes impurities for a collector;

forming a second layer , a third layer and a fourth layer on the first layer, said second layer comprising the first kind of semiconductor material which is not doped with impurities, said third layer comprising a second kind of semiconductor material which is not doped with impurities, and said fourth layer comprising the second kind of semiconductor material which includes impurities for a base;

forming a fifth layer on the fourth layer, said fifth layer comprising the first kind of semiconductor material which includes impurities for an emitter; and

diffusing the impurities for a base to the second layer.

8. A method for manufacturing a semiconductor device according to claim 7, wherein during the diffusion of the impurities, the impurities for a base are diffused to the second layer and simultaneously therewith the impurities for an emitter are diffused.

9. A method for manufacturing a semiconductor device according to claim 7, wherein a film thickness of the third layer is determined such that the impurities for a base are diffused to the second layer during the diffusion of the impurities.

10. A method for manufacturing a semiconductor device according to claim 9, wherein a film thickness of the third layer is determined such that the impurities for a base are diffused to the second layer during the diffusion of the impurities.

11. A semiconductor device according to claim 7, wherein an energy gap of the first kind of semiconductor material is larger than that of the second kind of semiconductor material.

12. A semiconductor device according to claim 8, wherein an energy gap of the first kind of semiconductor material is larger than that of the second kind of semiconductor material.

13. A semiconductor device according to claim 9, wherein an energy gap of the first kind of semiconductor material is larger than that of the second kind of semiconductor material.

14. A semiconductor device according to claim 7, wherein a breakdown field of the first kind of semiconductor material is larger than that of the second kind of semiconductor material.

15. A semiconductor device according to claim 8, wherein a breakdown field of the first kind of semiconductor material is larger than that of the second kind of semiconductor material.

16. A semiconductor device according to claim 9, wherein a breakdown field of the first kind of semiconductor material is larger than that of the second kind of semiconductor material.

17. A method for manufacturing a semiconductor device according to claim 7, wherein the first kind of semiconductor material is silicon, and the second kind of semiconductor material is silicon germanium.

18. A method for manufacturing a semiconductor device according to claim 8, wherein the first kind of semiconductor material is silicon, and the second kind of semiconductor material is silicon germanium.

19. A method for manufacturing a semiconductor device according to claim 9, wherein the first kind of semiconductor material is silicon, and the second kind of semiconductor material is silicon germanium.